AMENDMENTS TO THE CLAIMS

Please amend claims 1, 4, 5, 8, and 14-27 as follows:

1. (Currently Amended) A method of controlling a conductivity of a Ga_2O_3 system single crystal, comprising:

adding [[a]] an n-type ~~predetermined~~ dopant to the Ga_2O_3 system single crystal ~~such that said dopant is substituted for Ga in the Ga_2O_3 system single crystal~~ to change a resistivity of said Ga_2O_3 system single crystal linearly with an added amount of the n-type dopant ~~obtain a desired conductivity~~,

wherein said n-type ~~predetermined~~ dopant comprises ~~one of:~~ an n-type dopant for controlling said conductivity of the Ga_2O_3 system single crystal comprising one of Zr, Si, Hf, Ge, Sn, and Ti~~;~~ ~~said conductivity of the Ga_2O_3 system single crystal being controlled depending on an adding amount of said n-type dopant; and a p-type dopant for controlling said conductivity of the Ga_2O_3 system single crystal comprising one of H, Li, Na, K, Rb, Cs, Fr, Be, Ca, Sr, Ba, Ra, Mn, Fe, Co, Ni, Pd, Cu, Ag, Au, Zn, Cd, Hg, Tl, and Pb, said conductivity of the Ga_2O_3 system single crystal being controlled depending on an adding amount of said p-type dopant, and wherein a purity of said system single crystal is 6N~~.

2. – 3. (Canceled).

4. (Currently Amended) The method of controlling a conductivity of a Ga_2O_3 system single crystal according to claim 1, wherein a value of 2.0×10^{-3} to 8.0×10^{2} Ωcm is obtained as the ~~a desired~~ resistivity by said adding ~~a predetermined amount of~~ said n-type dopant.

5. (Currently Amended) The method of controlling a conductivity of a Ga_2O_3 system single crystal according to claim 4, wherein a carrier concentration of the Ga_2O_3 system single crystal is controlled to fall within a range of 5.5×10^{15} to $2.0 \times 10^{19}/cm^3$ as a range of the ~~desired~~ resistivity.

6. – 7. (Canceled).

8. (Currently Amended) The method of controlling a conductivity of a Ga_2O_3 system single crystal according to claim 1, wherein said Ga_2O_3 system single crystal is prepared with a Ga_2O_3 polycrystalline raw material, and

wherein the Ga_2O_3 polycrystalline raw material has a purity of 6N ~~1×10^3 Ωcm or more is obtained as a desired resistivity by adding a predetermined amount of said p-type dopant~~.

9. – 13. (Canceled).

14. (Withdrawn – Currently Amended) A light emitting element, comprising:

an n-type β-$AlGaO_3$ cladding layer, an active layer, a p-type β-$AlGaO_3$ cladding layer, and a p-type β-Ga_2O_3 contact layer respectively laminated in order on an n-type β-Ga_2O_3 substrate ~~contact layer~~, said ~~n-type~~ p-type β-Ga_2O_3 contact layer and said n-type β-Ga_2O_3 substrate comprising ~~made of~~ a β-Ga_2O_3 single crystal;

a transparent electrode and a pad electrode respectively formed in order on said p-type β-Ga_2O_3 contact layer; and

an n-side electrode formed [[over]] under a lower surface of said n-type β-Ga_2O_3 substrate ~~contact layer~~,

wherein a ~~desired~~ resistivity of said β-Ga_2O_3 single crystal is in a range of 2.0×10^{-3} to 8.0×10^{2} Ωcm ~~obtained~~,

wherein a ~~purity~~ carrier concentration of said β-Ga_2O_3 single crystal is within a range of 5.5×10^{15} to $2.0 \times 10^{19}/cm^3$ [[6N]],

wherein said n-type layers comprise a dopant including one of Si, Zr, Hf, Ge, Sn, and Ti, and

wherein said p-type layers comprise a dopant including one of H, Li, Na, K, Rb, Cs, Fr, Be, Ca, Sr, Ba, Ra, Mn, Fe, Co, Ni, Pd, Cu, Ag, Au, Zn, Cd, Hg, Tl, Mg, and Pb [[Rb]].

15. (Withdrawn – Currently Amended) The light emitting element of claim 14, wherein a carrier concentration of said p-type β-Ga_2O_3 contact layer is greater than that of said p-type β-$AlGaO_3$ cladding layer; and

wherein a carrier concentration of said n-type β-Ga_2O_3 ~~contact layer~~ substrate is greater than that of said n-type β-$AlGaO_3$ cladding layer.

16. (Currently Amended) A method of controlling a conductivity of a Ga_2O_3 system single crystal, comprising:

contacting a Ga_2O_3 polycrystalline raw material comprising ~~adding~~ a predetermined dopant to [[the]] a Ga_2O_3 ~~system single~~ seed crystal; and

growing the Ga_2O_3 system single crystal on the Ga_2O_3 seed crystal such that said predetermined dopant is substituted for Ga in the Ga_2O_3 system single crystal to obtain a desired resistivity in the Ga_2O_3 system single crystal of 1×10^{3} Ωcm or greater ~~conductivity~~,

wherein said predetermined dopant comprises a p-type dopant for controlling said conductivity of the Ga_2O_3 system single crystal, said p-type dopant comprising one of H, Li, Na, K, Rb, Cs, Fr, Be, Mg, Ca, Sr, Ba, Ra, Mn, Fe, Co, Ni, Pd, Cu, Ag, Au, Zn, Cd, Hg, Tl, and Pb~~, said~~

~~conductivity of the Ga_2O_3 system single crystal being controlled depending on an adding amount of said p-type dopant, and wherein a purity of said Ga_2O_3 system single crystal is 6N~~.

17. (Currently Amended) The light emitting element ~~method of controlling said conductivity of said Ga_2O_3 system single crystal~~ according to claim 14 [[16]], wherein the active layer comprises β-$GaInO_3$ ~~predetermined dopant comprises one of: said p-type dopant; and an n-type dopant for controlling said conductivity of the Ga_2O_3 system single crystal~~.

18. (Currently Amended) The method of controlling a conductivity of a Ga_2O_3 system single crystal according to claim [[17]] 16, wherein said Ga_2O_3 polycrystalline raw material has a purity of 6N ~~n-type dopant comprises one of Si, Hf, Ge, Sn, Ti, and Zr~~.

19. (Currently Amended) [[The]] A method of manufacturing ~~controlling a conductivity of~~ a Ga_2O_3 system single crystal ~~according to claim 17~~, comprising: ~~wherein a value of $2.0 X 10^{-3}$ to $8.0 X 10^2$ Ωcm is obtained as a desired resistivity by~~

adding ~~a predetermined amount of said~~ an n-type dopant to the Ga_2O_3 system single crystal, the n-type dopant comprising one of Zr, Si, Hf, Ge, Sn, and Ti; and

manufacturing the Ga_2O_3 system single crystal having a resistivity depending on an added amount of the n-type dopant by changing the resistivity of the Ga_2O_3 system single crystal linearly with the added amount of the n-type dopant.

20. (Currently Amended) ~~The method of forming a~~ A Ga_2O_3 system single crystal ~~layer according to claim 19,~~ comprising:

an n-type dopant, said n-type dopant comprising one of Zr, Si, Hf, Ge, Sn, and Ti; and ~~wherein~~

a ~~carrier concentration of the Ga_2O_3 system single crystal is controlled to fall within a range of 5.5×10^{15} to $2.0 \times 10^{19}/cm^3$ as a range of said desired~~ resistivity that depends on an added amount of said n-type dopant such that the added amount of the n-type dopant changes the resistivity linearly.

21. (Currently Amended) The method of controlling a conductivity of a Ga_2O_3 system single crystal according to claim 16, wherein said conductivity of the Ga_2O_3 system single crystal is exclusively dependent on an added amount of ~~1×10^3 Ωcm or more is obtained as a desired resistivity by adding a predetermined amount of~~ said p-type dopant.

22. (Currently Amended) A light emitting element ~~method of controlling a conductivity of a Ga_2O_3 system single crystal~~, comprising:

an n-type β-Ga_2O_3 contact layer, an n-type β-$AlGaO_3$ cladding layer, an active layer, a p-type β-$AlGaO_3$ cladding layer, and a p-type β-Ga_2O_3 contact layer respectively laminated in order on an insulation type β-Ga_2O_3 substrate, said p-type β-Ga_2O_3 contact layer, said n-type β-Ga_2O_3 substrate, and said insulation type β-Ga_2O_3 substrate comprising a β-Ga_2O_3 single crystal;

a transparent electrode and a pad electrode respectively formed in order on said p-type β-Ga_2O_3 contact layer; and

an n-side electrode formed on said n-type β-Ga_2O_3 contact layer ~~adding a predetermined dopant to the Ga_2O_3 system single crystal such that said dopant is substituted for Ga in the Ga_2O_3 system single crystal to obtain a desired conductivity~~,

wherein said ~~predetermined dopant comprises a~~ p-type layers comprise a dopant including ~~for controlling said conductivity of the Ga_2O_3 system single crystal, said p-type dopant comprising~~ one

of H, Li, Na, K, Rb, Cs, Fr, Be, Mg, Ca, Sr, Ba, Ra, Mn, Fe, Co, Ni, Pd, Cu, Ag, Au, Zn, Cd, Hg, Tl, and Rb [[Pb]],

wherein said n-type layers comprise a dopant including one of Si, Hf, Ge, Sn, Zr, and Ti ~~said conductivity of the Ga_2O_3 system single crystal being controlled depending on an adding amount of said p-type dopant~~, and

wherein a resistivity of said insulation type β-Ga_2O_3 substrate is 1×10^3 Ωcm or greater ~~said desired conductivity is dependent upon an amount of said predetermined dopant added to said Ga_2O_3 system single crystal~~.

23. (Currently Amended) The ~~method of controlling said conductivity of said Ga_2O_3 system single crystal~~ light emitting element according to claim 22, wherein a carrier concentration of said p-type β-Ga_2O_3 contact layer is greater than that of said p-type β-$AlGaO_3$ cladding layer, and

wherein a carrier concentration of said n-type β-Ga_2O_3 contact layer is greater than that of said n-type β-$AlGaO_3$ cladding layer ~~the predetermined dopant comprises one of: said p-type dopant; and an n-type dopant for controlling said conductivity of the Ga_2O_3 system single crystal~~.

24. (Currently Amended) The light emitting element ~~method of controlling a conductivity of a Ga_2O_3 system single crystal~~ according to claim [[23]] 22, wherein said active layer comprises β-$GaInO_3$ ~~n-type dopant comprises one of Si, Hf, Ge, Sn, Ti, and Zr~~.

25. (Currently Amended) The method of manufacturing ~~controlling a conductivity of~~ a Ga_2O_3 system single crystal according to claim [[23]] 19, wherein ~~a value of 2.0×10^{-3} to 8.0×10^2 Ωcm is obtained as a desired resistivity by~~ adding ~~a predetermined amount of~~ said n-type dopant comprises one of Si, Hf, and Sn.

26. (Currently Amended) The method of ~~forming~~ controlling a conductivity of a Ga_2O_3 system single crystal [[layer]] according to claim [[25]] 1, wherein the n-type dopant comprises one of Si, Hf, and Sn ~~a carrier concentration of the Ga_2O_3 system single crystal is controlled to fall within a range of 5.5×10^{15} to $2.0 \times 10^{19}/cm^3$ as a range of said desired resistivity~~.

27. (Currently Amended) The ~~method of controlling a conductivity of a~~ Ga_2O_3 system single crystal according to claim [[22]] 20, wherein said n-type dopant comprises one of Si, Hf, and Sn ~~1×10^3 Ωcm or more is obtained as a desired resistivity by adding a predetermined amount of said p-type dopant~~.